

## Stewart Island Habitat Restoration (KY-15)

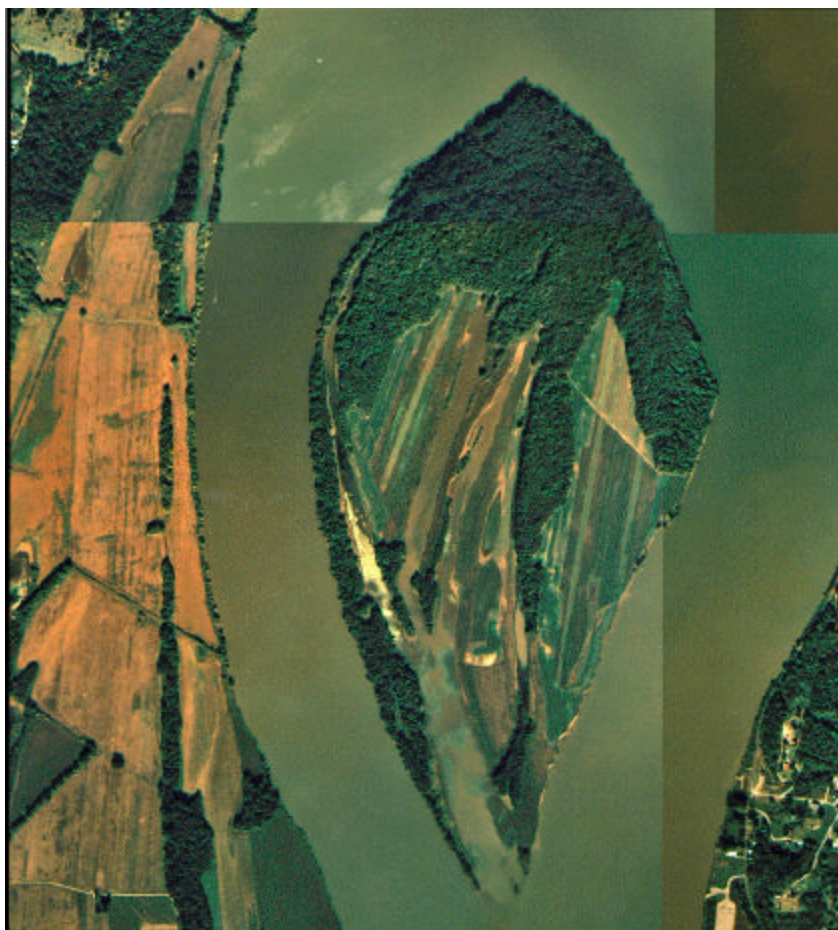
### 1.0 Location

The proposed Stewart Island Habitat Restoration project area consists of approximately 396 acres located in Livingston County, Kentucky near the town of Birdsville, Kentucky. The project area is owned by the U.S. Army Corps of Engineers (USACE) and is located in the Smithland Pool between Ohio River Miles (ORM) 913-915. The project site is within the jurisdiction of the Louisville District, USACE.



### 2.0 Project Goal, Description, and Rationale

The goals for the Stewart Island Habitat Restoration project involve controlling bank erosion on the main channel (east) side of the island and restoration of bottomland hardwood forests and wetlands. Bank stabilization would involve placement of armoring material (rip-rap) on the severely eroded areas. Erosion control would protect aquatic habitats and reduce the loss of island terrestrial habitats. Restoration of bottomland hardwood wetlands on the island would enhance the habitat for a variety of species and protect water quality. Restoring mast producing bottomland hardwood trees would provide habitat for a variety of species, especially neotropical migrant birds and resident wildlife.

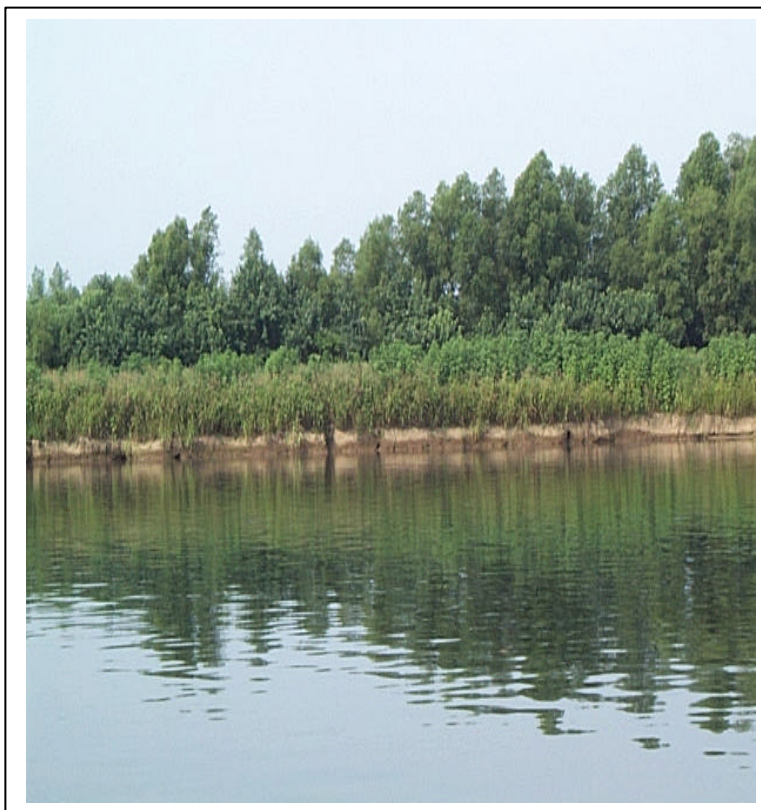




### 3.0 Existing Conditions

#### Terrestrial/Riparian Habitat:

Habitat on the main channel side of Stewart Island is experiencing problems due to major bank erosion. Much of the erosion is likely due to wave action from barges and other boats. This erosion not only results in loss of publicly owned land, but it also deteriorates aquatic habitat in the adjacent river. Approximately 40% (155 acres) of the island contains bottomland hardwood forests. Most of this forest is located on the upstream end of the island. Forests on the island are dominated by light mast producing trees such as silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), and black willow (*Salix nigra*). Cropfields occur on part of the 191 acres of open land found on the island.



**Aquatic Habitats:** A relatively large slough is located on the downstream half of the island. Most of the aquatic habitat in that area is surrounded by wetlands dominated by American lotus (*Nelumbo lutea*). The monotypic stand of lotus provides excellent brood habitat for resident wood ducks, and the shallow water habitat is valuable for spawning, nursery, resting, and feeding areas for many aquatic species.

**Wetlands:** Much of the slough area containing hydrophytic vegetation dominated by American lotus is a potential jurisdictional wetland. The emergent vegetation in the wetland areas provides important habitat for a variety of species, both aquatic and terrestrial. Portions of the bottomland hardwoods on the island would also be considered jurisdictional.



**Federally-Listed Threatened and Endangered Species:** According to the U.S. Fish and Wildlife Service (USFWS), there are 10 federally-listed endangered species and 2 federally-listed threatened species known to occur in Livingston County, Kentucky. These species are listed on Table 1.

The riparian bottomland hardwood forests on the island may provide summer roost habitat for the Indiana bat. Preferred tree species would include a mixture of oaks (*Quercus* spp.), silver maple, cottonwood, and shagbark hickory (*Carya ovata*) (INHS, 1996). The riparian areas would also provide feeding/foraging habitat for the Indiana and gray bats.

Bald eagles may utilize the forested areas adjacent to the Ohio River for roosting/perching habitat and feed in the open water areas. There are no known eagle nests in the project area.

The interior least tern is typically associated with sandbar habitats in large river systems. Open sandbar habitats are used as nesting/brood rearing habitat and shallow water areas are used for feeding. There does not appear to be suitable least tern habitat within the project area as the sandbar habitat at the upstream end of the island is typically submerged due to Stewart Island being in the extreme downstream end of the Smithland pool.

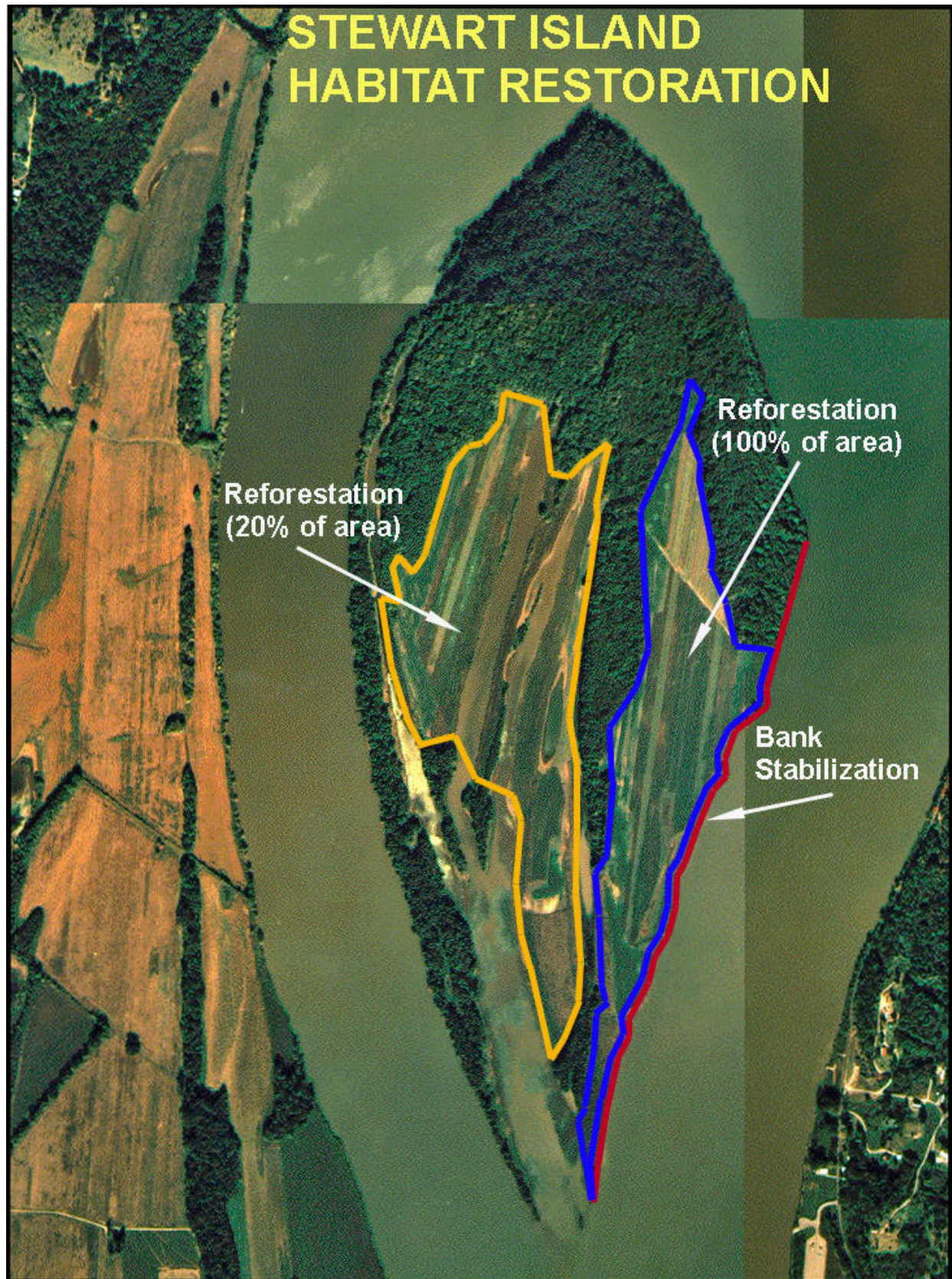
All of the mussels are freshwater species that typically inhabit medium to large river systems. The mussels are typically found in habitats with substrates that range from silt to gravel, and in water depths from 0.5 to 8.0 meters. These species are generally associated with moderate to fast flowing water. Although there does not appear to be suitable habitat for these species in the immediate vicinity of the project area, a mussel study along the eastern portion of the island may be appropriate prior to construction.

Habitat for Price's potato bean is typically moist, low areas adjacent to streams and small rivers. Price's potato bean is never found in the frequently flooded floodplains of major rivers, such as the Ohio River.

<b>Table 1. Federally-listed species known to occur in Livingston County, Kentucky.</b>			
<b>Common Name</b>	<b>Scientific Name</b>	<b>Federal Status</b>	<b>Potential Habitat Present</b>
gray bat	<i>Myotis grisescens</i>	Endangered	Yes
Indiana bat	<i>Myotis sodalis</i>	Endangered	Yes
bald eagle	<i>Haliaeetus leucocephalis</i>	Threatened	Yes
interior least tern	<i>Sterna antillarum</i>	Endangered	No
eastern fanshell pearly mussel	<i>Cyprogenia stegaria</i>	Endangered	No
clubshell mussel	<i>Pluerobema clava</i>	Endangered	No
pink mucket pearly mussel	<i>Lampsilis abrupta</i>	Endangered	No
ring pink mussel	<i>Obovaria retusa</i>	Endangered	No
white wartyback mussel	<i>Plethobasus cicatricosus</i>	Endangered	No
orange-foot pimple back pearly mussel	<i>Plethobasus cooperianus</i>	Endangered	No
fat pocketbook mussel	<i>Potamilus capax</i>	Endangered	No
Price's potato bean	<i>Apios priceana</i>	Threatened	Yes
Source: U.S. Fish and Wildlife Service, 1999			



#### 4.0 Project Diagram



## 5.0 Habitat Restoration/Engineering Design, Assumptions, and Requirements

### 5.1 Existing Ecological/Engineering Concern

Stewart Island is experiencing severe erosion on the main channel side of the island. It appears that much of the erosion is caused by wave action from barges and other boat traffic. Placement of armoring material (rip-rap) on the main channel side banks would reduce erosion and therefore protect terrestrial habitat on the island and aquatic habitat in the adjacent and downstream Ohio River. Reforesting a portion of the island with native mast producing bottomland hardwood trees would help reduce erosion, protect water quality, and provide habitat for a variety of species.

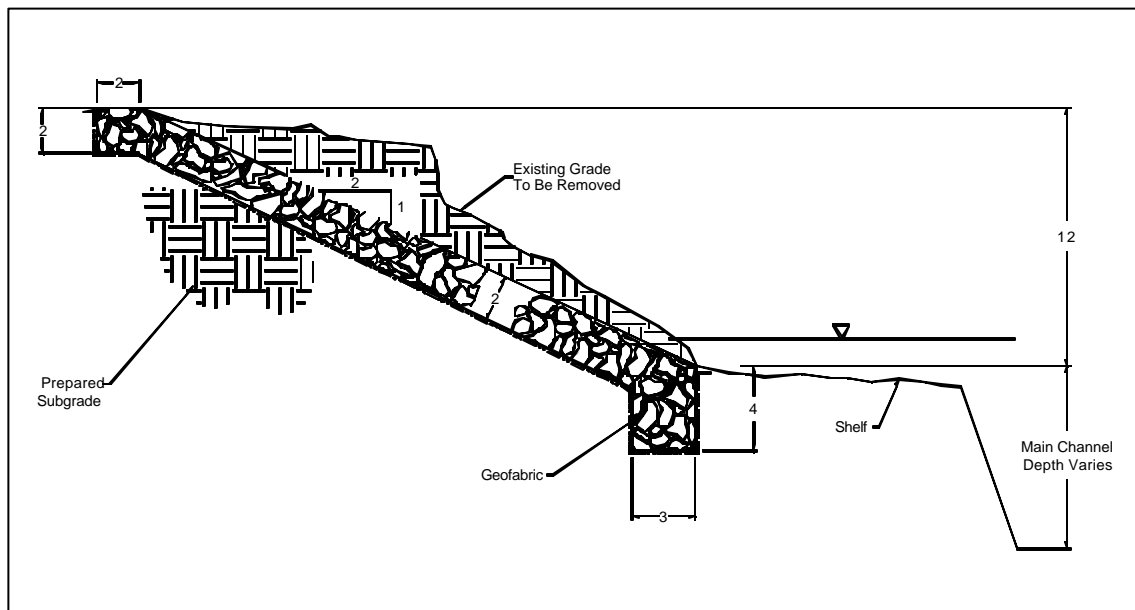
### 5.2 Bank Stabilization

Banks on the main channel side of the island need to be protected from further erosion. This could be accomplished by armoring the banks with rip-rap material to protect them against wave action. Also, subsequent reforestation of the open land immediately adjacent to these banks would help reduce rates of erosion by slowing runoff over the area.

#### Design Features:

- ◆ Clean slope of all trees and brush
- ◆ Excavate bank to provide a 2:1 slope
- ◆ Cover slope with a filter fabric with the following properties:
- ◆ Rip-rap shall extend up the banks of the channel to a height of 12 feet vertically from the channel bottom (Figure 2).

**Figure 2. Bank stabilization detail.**



### 5.3 Stewart Island Bottomland Hardwood Restoration

Approximately 45% (155 acres) of the terrestrial habitat on Stewart Island is currently forested. Most of this forest is located on the upstream half of the island where it helps protect the area from erosion. However, no forest is currently found on the main channel side of the island where the serious erosion problem exists. Approximately 73 acres of



farmed and other open land is located immediately adjacent to the erosion problem area. All 73 acres of this area would be reforested with native mast producing bottomland hardwood trees. This forested area would help protect the island from further erosion while providing important habitat for a variety of species. An additional 20% (24 acres) of the remaining open land on the island, especially the land immediately adjacent to the slough areas, would also be reforested. This additional forest would provide increased wildlife habitat and protect the adjacent shallow water habitats in the slough areas.

Based on suggestions provided by the Kentucky Division of Forestry, the preferred tree species to plant in the area would include swamp chestnut oak (*Quercus michauxii*), swamp white oak (*Quercus bicolor*), overcup oak (*Quercus lyrata*), pin oak (*Quercus palustris*), cherrybark oak (*Quercus pagodaefolia*), Nuttall oak (*Quercus nuttallii*), willow oak (*Quercus phellos*), bur oak (*Quercus macrocarpa*), and bald cypress (*Taxodium distichum*). Aggressive light mast producing species, such as silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), eastern cottonwood (*Populus deltoides*), and willows (*Salix spp.*), would be allowed to reestablish themselves through natural seed dispersal from nearby forests.

Soil types, hydrology, and terrain position will be the primary factors considered when selecting the tree species to be planted in each area. A detailed planting design, which would be part of the overall project management/master plan, should be developed in order to insure that the planting effort is successful. Costs for reforestation are shown on Table 2.

Open areas that are not reforested will be maintained in order to provide habitat diversity. Mowing, burning, and/or tilling may be used to maintain these open areas. Depending upon the type of wildlife management prescribed in the project management plan, other openings such as foodplots or agricultural outleaves may be desirable to provide increased foraging opportunities for a variety of species.

### 5.3 Planning/Engineering Assumptions

- ◆ Average channel velocities are 3 feet per second.
- ◆ All rip-rap material would be shipped by barge to the project site. All costs for shipping are included in the material costs.

## 6.0 Cost Estimate (Bank Stabilization and Reforestation)

Bank stabilization and reforestation cost estimates are summarized on Table 2. A detailed MCACES cost estimate for the proposed project is included in Appendix C.

<b>Table 2. Project Costs.</b>	
<b>Item</b>	<b>Costs</b>
Prepare Project Management/Master Plan	\$5,000
Bank Stabilization Along Main Channel	\$508,800
Reforestation (97 acres @ \$219.30/acre)	\$21,300
<b>TOTAL</b>	<b>\$535,100</b>

## 7.0 Schedule

Estimated plan development, bank stabilization, and reforestation times are shown on Table 3.

<b>Table 3. Construction Schedule.</b>	
<b>Item</b>	<b>Time</b>
Preparation of Management/Master Plan	6-12 months
Bank Stabilization	1 year
Bottomland Hardwood Reforestation	1-2 years

## 8.0 Expected Ecological Benefits

**Terrestrial/Riparian Habitats:** Placement of bank stabilization materials along the main Ohio River channel will protect the island from further loss of terrestrial habitat. Reforestation of portions of the project area would reduce erosion and provide beneficial impacts to terrestrial and riparian resources in the area. Reforestation would provide habitat for bald eagles, Indiana bats, deer, furbearers, and several neotropical migrant birds.

**Aquatic Habitats:** Implementation of the proposed project would provide beneficial impacts to aquatic resources in the area. Protection and/or enhancement of shallow water habitats would provide spawning, refuge, nursery, and foraging habitat for many riverine fish species. Placement of rip-rap along the river bank would reduce potential bank erosion and therefore sedimentation in the adjacent river. The conversion of agricultural land to bottomland hardwood forest would indirectly improve water quality by reducing the amount of silt and contaminants from entering the Ohio River via stormwater runoff.

**Wetlands:** Restoration of bottomland hardwood wetlands on the project area would provide habitat for numerous wetland species including waterfowl and shorebirds.



**Federally-Listed Threatened and Endangered Species:** Successful reforestation of the project area would provide summer roosting habitat for the Indiana bat, and winter roosting/perching habitat for bald eagles.

**Socioeconomic Resources:** There would be long-term beneficial impacts to socioeconomic resources as a result of implementing the proposed project. Long-term benefits would be realized through improved recreational opportunities for hunting, fishing, wildlife observation, and other non-consumptive uses.

## 9.0 Potential Adverse Environmental Impacts

**Terrestrial/Riparian Habitats:** There would be no reasonably foreseeable adverse impacts to terrestrial/riparian habitats as a result of implementing the proposed project.



**Aquatic Habitats:** Adverse impacts to aquatic species in the Ohio River would be short-term and minor. During the bank stabilization phase of the proposed project, sensitive aquatic species immediately downstream from the site could be adversely impacted by degraded water quality associated with displaced bank sediments.

**Wetlands:** There would be no reasonably foreseeable adverse impacts to jurisdictional wetlands as a result of implementing the proposed project.

**Federally-Listed Threatened and Endangered Species:** There would be no reasonably foreseeable adverse impacts to federally-listed threatened or endangered species as a result of implementing the proposed project.

**Socioeconomic Resources:** There would be potential long-term adverse impacts to local farmers currently farming land on Stewart Island due to conversion of productive cropland to bottomland hardwood forest.

## **10.0 Mitigation**

No mitigation would be required to implement this project. Minor short-term impacts associated with placement of bank stabilization material may occur during the construction of this project, however, no significant adverse impacts are expected. The use of best management practices and construction techniques would minimize adverse water quality impacts.

## **11.0 Preliminary Operation and Maintenance Costs**

Operation and maintenance costs would be minimal for this project because the Kentucky Department of Fish and Wildlife Resources already has a budget to manage the lands on Stewart Island.

## **12.0 Potential Cost Share Sponsor(s)**

- ◆ Kentucky Department of Fish and Wildlife Resources
- ◆ Ducks Unlimited

## **13.0 Expected Life of the Project**

As presently envisioned, the Stewart Island project area will be managed in perpetuity for the benefit of natural resources by the Kentucky Department of Fish and Wildlife Resources.

## **14.0 Hazardous, Toxic, and Radiological Waste Considerations**

Potential impacts of hazardous, toxic, and radiological waste (HTRW) at the site were visually assessed during a site visit.

**Site Inspection Findings:** The proposed Stewart Island Habitat Restoration project area is located in Livingston County, Kentucky near the town of Birdsville, Kentucky. The project area is located in the Ohio River between ORM 913-915.

The following environmental conditions were considered when conducting the July 13, 1999 project area inspection:

- |                             |                          |
|-----------------------------|--------------------------|
| ◆ Suspicious/Unusual Odors; | ◆ Distressed Vegetation; |
| ◆ Discolored Soil;          | ◆ Dirt/Debris Mounds;    |

- ◆ Ground Depressions;
- ◆ Oil Staining;
- ◆ Above Ground Storage Tanks (ASTs);
- ◆ Underground Storage Tanks (USTs);
- ◆ Landfills/Wastepiles;
- ◆ Impoundments/Lagoons;
- ◆ Drum/Container Storage;
- ◆ Electrical Transformers;
- ◆ Standpipes/Vent pipes;
- ◆ Surface Water Discharges;
- ◆ Power or Pipelines;
- ◆ Mining/Logging; and
- ◆ Other.

**HTRW Findings and Conclusions:** None of the environmental conditions listed above were observed in the project area.

## 15.0 Property Ownership & River Access

Table 4. Property Characteristics				
<b>Site Name: Stewart's Island</b>				
<b>Location: Livingston County, Kentucky</b>				
Map/Parcel Number	Owner	Mailing Address	Market Value	Acreage
(no number)	U.S. Government	(not listed)	\$ 148,750	350.00 approx.

## 16.0 References

References:	
INHS, 1996	Illinois Natural History Survey Reports, March-April 1996. Survey Document #2152. Center for Biodiversity (J. Hofmann).
USFWS, 1983	U.S. Fish and Wildlife Service, 1983. Northern States Bald Eagle Recovery Plan. USFWS Denver, Colorado
USFWS, 1983	U.S. Fish and Wildlife Service, 1983. Recovery Plan for the Indiana Bat ( <i>Myotis sodalis</i> ).
USFWS, 1984	U.S. Fish and Wildlife Service, 1984. Recovery Plan for the Orange-footed Pearly Mussel, <i>Plethobasus cooperianus</i> . Prepared by S. Ahlstedt for USFWS Region 4 August 30, 1984. 46pp.
USFWS, 1985	U.S. Fish and Wildlife Service, 1996. Recovery Plan for the Pink Mucket Pearly Mussel. USFWS Atlanta, Georgia.
USFWS, 1991	U.S. Fish and Wildlife Service, 1991. Recovery Plan for Ring Pink Mussel ( <i>Obovaria retusa</i> ). Prepared by R.G. Biggins for the Southeast Region USFWS February, 1991. 24pp.
USFWS, 1991	U.S. Fish and Wildlife Service, 1991. Fanshell Recovery Plan. Prepared by R.G. Biggins for the Southeast Region USFWS July 9, 1991. 37pp.
USFWS, 1997	U.S. Fish and Wildlife Service, 1997. Species Accounts: Pink Mucket Pearly Mussel ( <i>Lampsilis abrupta</i> ).
USFWS, 1999	U.S. Fish and Wildlife Service, August 6, 1999. Federally Listed Endangered and Threatened Species in Kentucky.

**APPENDIX A      Threatened & Endangered Species**



## APPENDIX B Plan Formulation and Incremental Analysis Checklist

**Project Site Location:** The proposed Stewart Island Habitat Restoration project area consists of approximately 396 acres and is located in Livingston County, Kentucky near the town of Birdsville, Kentucky. The project area is located in the Smithland Pool between Ohio River miles (ORM) 913-915. The project site is within the jurisdiction of the Louisville District, U.S. Army Corps of Engineers (USACE).

**Description of Plan selected:** The proposed plan would require placement of bank stabilization material on the main channel (east) side of Stewart Island. In addition, approximately 97 acres of the open area on the island would be reforested with native mast producing bottomland hardwood trees.

### Alternatives of the Selected Plan:

Smaller Size Plans Possible? Yes, limit the reforestation effort to a 300ft corridor adjacent to the bank stabilization area.

Larger Size Plan Possible? Yes, reforest more of the open land on the island.

Other alternatives? No

Restore/Enhance/Protect Terrestrial Habitats? ☒ YES Objective numbers met ☒ T2

Restore, Enhance, & Protect Wetlands? ☒ YES Objective numbers met ☒ W1

Restore/Enhance/Protect Aquatic Habitats? ☒ YES Objective numbers met ☒ A1, A2, A8

**Type species benefited:** Numerous aquatic organisms, migratory waterfowl, shorebirds, neotropical migrant birds, furbearers, and others.

**Endangered species benefited:** Indiana bats and bald eagles could benefit from reforestation of bottomland hardwood habitats.

**Can estimated amount of habitat units be determined:** Approximately 97 acres of open land would be reforested with native bottomland hardwood trees and 5,500 linear feet of shoreline would be protected..

### Plan acceptable to Resources Agencies?

U.S. Fish & Wildlife Service?

State Department of Natural Resources? Yes

Plan considered complete? Connected to other plans for restoration?

Real Estate owned by State Agency? No Federal Agency? Yes

Real Estate privately owned? No

If privately owned, what is status of future acquisition? No acquisition required.

**Does this plan contribute significantly to the ecosystem structure or function requiring restoration? What goal or values does it meet in the Ecosystem Restoration Plan?**

Yes, this project would meet the goals of island restoration and protection and terrestrial/riparian habitat restoration.

**Is this restoration plan a part of restoration projects planned by other agencies? (i.e. North American Waterfowl Management Plan, etc.)**

**In agencies opinion is the plan the most cost effective plan that can be implemented at this location?**

**Can this plan be implemented more cost effectively by another agency or institution?**

**Yes / No**

**Who:**

**From an incremental cost basis are there any features in this plan that would make the project more expensive than a typical project of the same nature? For embayment type plans is there excessive haul distance to disposal site? More expensive type disposal? Spoil that requires special handling/disposal?**

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**Potential Project Sponsor:**

**Government Entity:** \_\_\_\_\_

**Non-government Entity** \_\_\_\_\_

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Corps Contractor \_\_\_\_\_ Date \_\_\_\_\_

U.S. Fish & Wildlife Representative \_\_\_\_\_ Date \_\_\_\_\_

State Agency Representative \_\_\_\_\_ Date \_\_\_\_\_

U.S. Army Corps of Engineers Representative \_\_\_\_\_ Date \_\_\_\_\_

## **Terrestrial Habitat Objectives**

- T1     Riparian Corridors
- T2     Islands
- T3     Floodplains
- T4     Other unique habitats (canebrakes, river bluffs, etc.)

## **Wetland Habitat Objectives**

- W1     Forested Wetlands: Bottomland Hardwoods
- W2     Forested Wetlands: Cypress/Tupelo Swamps and other unique forested wetlands
- W3     Scrub/Shrub Emergent Wetlands: isolated from the river except during high water and contiguous (includes scrub/shrub wetlands in embayments and island sloughs)

## **Aquatic Habitat Objectives**

- A1     Backwaters (sloughs, embayments, oxbows, bayous, etc.)
- A2     Riverine submerged and aquatic vegetation
- A3     Sand and gravel bars
- A4     Riffles/Runs (tailwaters)
- A5     Pools (deep water, slow velocity, soft substrate)
- A6     Side Channel/Back Channel Habitat
- A7     Fish Passage
- A8     Riparian Enhancement/Protection



**APPENDIX C          Micro Computer-Aided Cost Engineering System (MCACES)**